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D I R E C T I O N S
FOR IMPREGNATING
T H E
B U X T O N - W A T E R,
W I T H
ITS OWN AND OTHER GASES;
A N D
FOR COMPOSING ARTIFICIAL
B U X T O N - W A T E R;

By GEORGE PEARSON, M. D. *✓*

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Meta scientiarum vera et legitima non alia est, quam
ut dotetur vita humana novis inventis et copiis.

VERULAM.

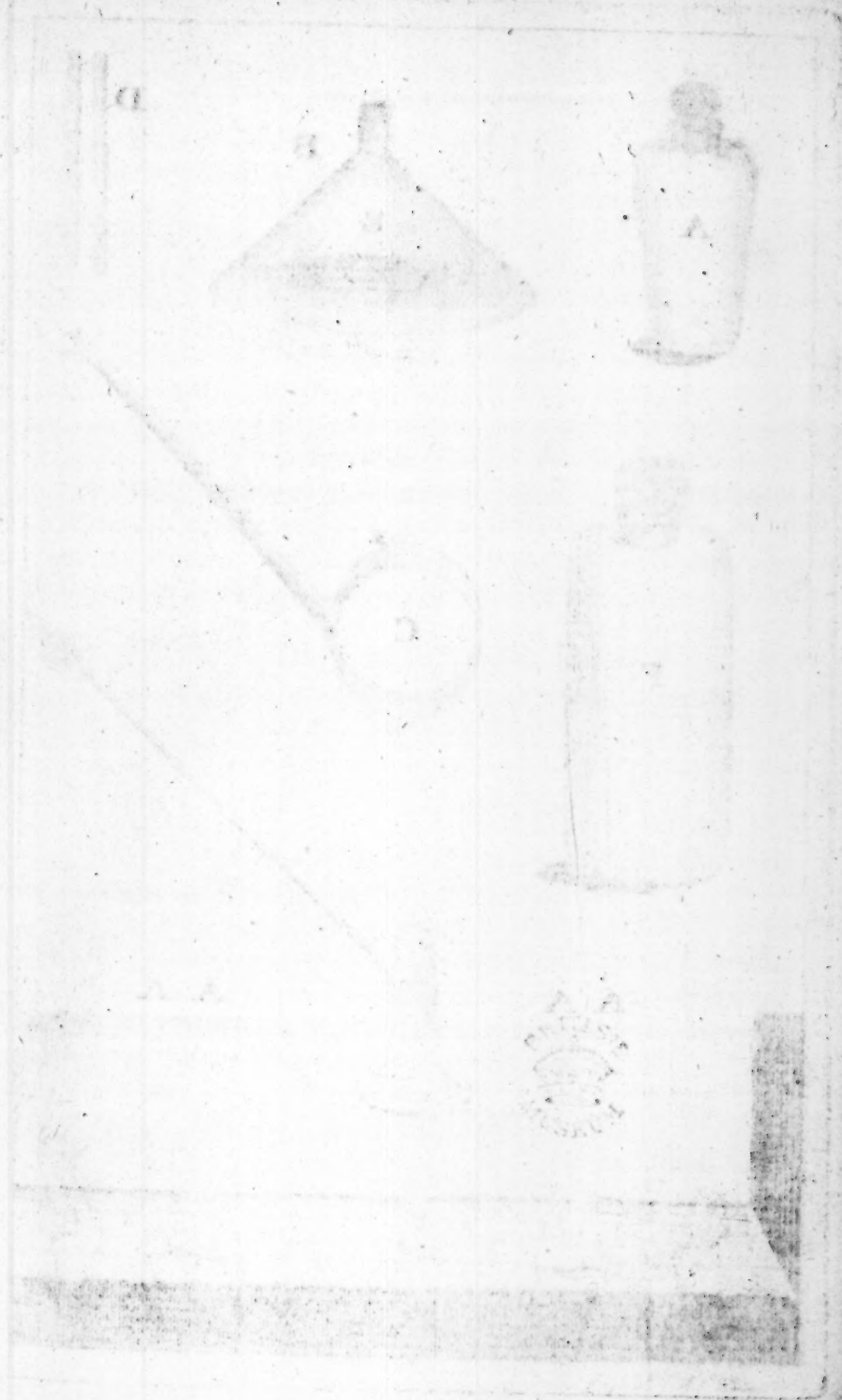
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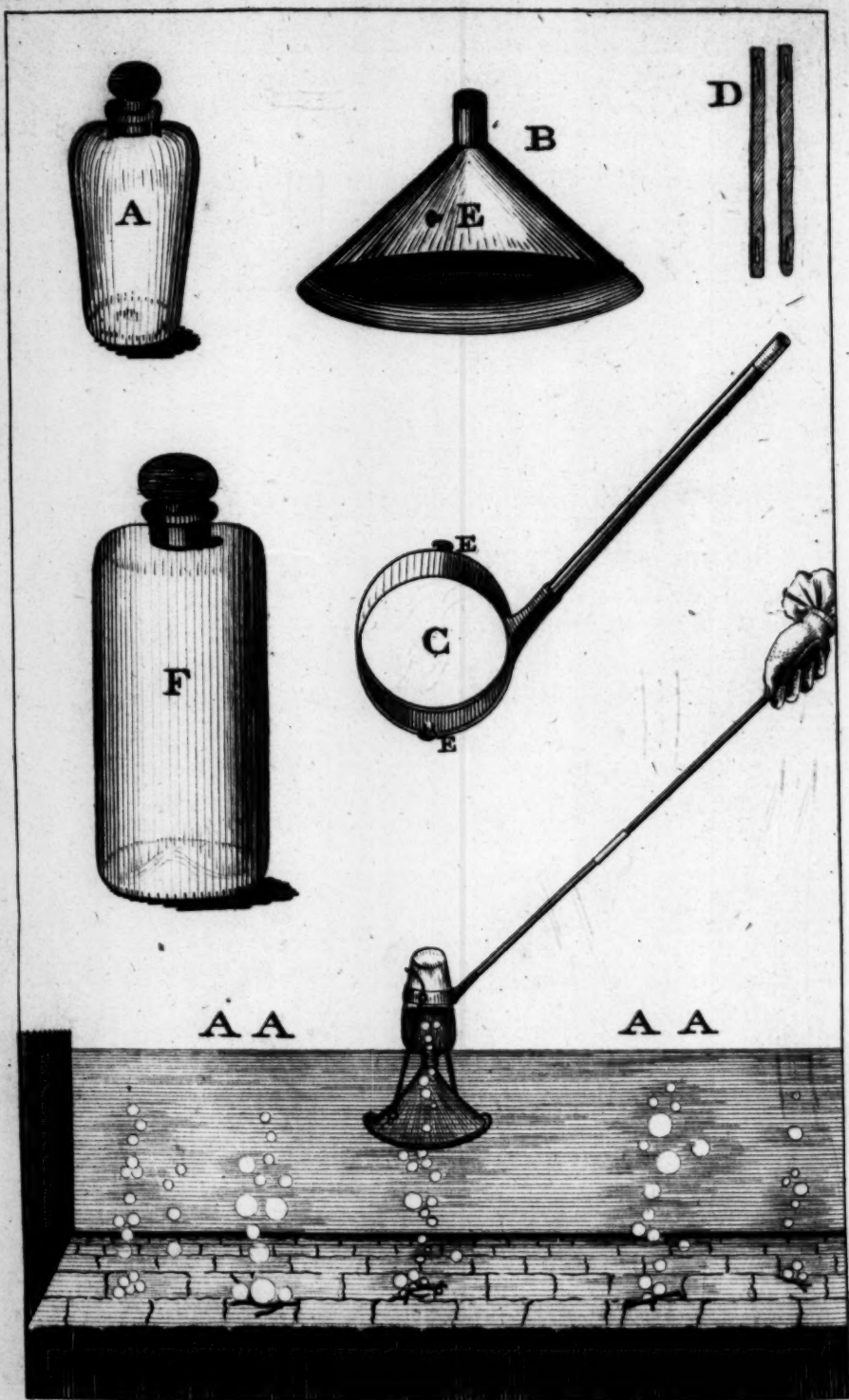
M,DCC,LXXXV.

In general the artificial medicated waters produce the same good effects as the natural waters, and in some instances even seem to excel them: my own health, though not perfectly established, has, from the sole use of them, been restored beyond expectation.

BERGMAN.

From the Office





Explanation of the Plate.

A. A phial, with a glass-stopper, which should contain from one and a half to two ounce-measures. It is rather wider towards the top than at the bottom, to prevent its falling through the ring C when it is immersed in the bath together with its funnel B, for the purpose of filling them with water.

B. A tin-funnel, which is five inches in diameter at the bottom, with a knob E on each side of it on which are to be fixed the leather-straps D.

C. A brass or tin-ring of such a width as to admit about half of the phial to pass through it:—by means of a socket it is fastened to the end of a wooden handle, a foot in length. This socket with the handle are so fixed to the ring as to form with the horizontal plane of it, an angle of about one hundred and thirty degrees.

The phial A with its funnel B, inserted into its throat, being placed within this ring, and the straps

D

2 EXPLANATION of the PLATE.

D being fixed on the knobs E of this funnel and ring they must be immersed in the Gentleman's bath in an upright position, so as to fill them with water: then invert them, while thus immersed, and in this position insert the end of a wooden rod, four feet long, or of any other convenient length, into the socket at the other end of the handle of the ring C. By means of this apparatus a person may stand at the side of the bath, and, with ease, hold this inverted bottle and funnel (keeping the neck of the bottle below the surface of the water) perpendicularly, over the bubbles which issue spontaneously from the pavement, and rise through the water as described in the note to p. 5 and 6.

F. A wide mouthed bottle with a glass stopper, which should contain from eight to twelve ounces of water.

A. A. This figure represents the bubbles of gas rising through the Gentleman's bath at Buxton, see p. 5 and 6, and the apparatus above-described collecting them.

(4)

THE analysis of the Buxton-Water, lately published†, shews, that its medicinal effects depend upon its PURITY, its TEMPERATURE, and on its being impregnated with a PERMANENT VAPOUR generally called gas ; which is either phlogisticated air, or a gas peculiar to the tepid springs at Buxton, and, perhaps, to the warm waters of Bath.

This gas which may be distinguished by the epithet MEDICINAL, is united to the water, and a large quantity of it is also suspended therein, as the gas sylvestre is in liquors in the state of vinous fermentation.

† Observations and experiments for investigating the chymical history of the tepid springs of Buxton, &c. in 2 vol. 8vo. 1784, by George Pearson, M. D.

The efficacy of the Buxton-Water is owing, principally, to its medicinal gas; therefore it is extremely probable that this fluid may, upon some occasions, be rendered more efficacious, by suspending in it a larger quantity of this permanent vapour than it naturally contains. On this account I supposed, that the publication of a method of suspending in the Buxton-Water an additional quantity of its medicinal gas might be useful to those who resort to this spring with the view of restoring health.

For this purpose I employ the apparatus represented on the plate at the end of this pamphlet. The manner of using this contrivance will be readily understood, by means of the following directions.

The phial A, with the funnel B inserted into its throat, being placed within the ring C, and, with the leather straps D, fixed on the knobs E, of the funnel,
and

and of the ring, immerse them in the gentleman's bath, so as to fill the phial and funnel: then hold them in an inverted position, with the mouth of the phial below the surface of the water. In the next place, observe through what parts of the pavement of the bath the bubbles* of gas rise

* In order to assist the reader in forming a just conception of the manner in which this bath separates spontaneously one of its gases, I shall add the following quotations.

" The baths contain these bubbles," viz. of gas, " in
 " every part of them, especially upon a little agi-
 " tation. Moreover streams or clusters of these bubbles
 " of various sizes, from the magnitude of the smallest
 " pin's head, to the bulk of a cherry, or even some-
 " times of a billiard ball, every now and then break
 " out from the small holes between the stones that
 " compose the pavement of the baths, and dart per-
 " pendicularly upwards, through the whole thickness of
 " the water to its surface, where they burst and vanish
 " in the atmosphere.—Work above cited, vol 1,
 " p. 152, 153. " The

rise in the greatest abundance, and place these inverted vessels over them, so that they shall ascend within the funnel, and thence into the phial. When the whole of the water in the inverted bottle is displaced by gas, draw it to the side of the bath, taking care to keep its mouth under the fur-

“ The bulk of a single cluster of these bubbles
 “ is various, being from one drachm to two, or some-
 “ times three ounce measures — — — — —

“ In this manner,” viz. by holding an inverted bot-
 tle and funnel in the bath, “ a person may collect
 “ from about two to five pint measures of this per-
 “ manent vapour in an hour. — — — — —

“ About thirty quart measures of the permanent
 “ vapour that escapes spontaneously from the Buxton-
 “ Water, were collected in fourteen days, by a person
 “ who stood an hour at a time in the bath every
 “ day, but who, commonly, held in each hand a
 “ bottle and inverted funnel.”—Work above cited,
 vol. 2, p. 24, 25.

face

face of the water. Then remove the funnel, and introduce the glass stopple belonging to the inverted phial.

Having in this manner procured a bottle filled with gas, it may when required be mixed with the Buxton-Water. For this purpose this phial of gas must be immerfed in the well, and there having taken out its stopple while in an inverted position, turn it upright under the mouth of the bottle F, previously filled with water, and held in an inverted position; by which means the gas will be transferred into this vessel. This being done, introduce into the bottle F its stopper, and, after agitating it for about a minute, open it, and drink the water out of this bottle as speedily as possible.

A great part of the gas in this way added, unavoidably flies off before the water can be drunk, but a much greater quantity of this substance may, by this method, be
taken

taken into the stomach, than by drinking the water in the state in which it flows into the well. A small quantity of this gas is liable to be drawn into the lungs during the drinking the Buxton-Water, but it is mixed with so large a proportion of air, as to be perfectly innoxious.†

If

† This method of drinking the Buxton-Water, with an additional quantity of its medicinal gas, will be preferred by those, who are of opinion, that the water of the New Bason, contains a smaller quantity of this permanent vapour, or of what is commonly called spirit, than that of the Old St. Ann's well. Many invalids also, who have frequented the Buxton-Waters for several years, declare that the water of the New Well is less efficacious than that of the former one. On the other hand, *has read, in my work on* every one who *Buxton-Water, an account* ~~understands~~ the nature of the late alterations in the situation of the well allows, that the water is conveyed from the reservoir, or source at the south end of the crescent, in such a manner as to prevent more effectually its

virtues

If a still greater quantity of this medicinal Gas be required to be taken into the stomach, than can be swallowed by the above virtues being impaired, than was done by means of a leaden pipe, a few years preceding the demolition of the old well. Those, however, who wish to drink the Buxton-Water with the whole of its natural impregnation of gas, may drink the pump-water upon the paved foot-way, on the east-side of the hall; which undoubtedly contains as great a quantity of this subtile matter as the Old Well, or even as the water at the Spring-head.

The gas which separates itself spontaneously from the Gentleman's Bath, has not been extricated from the Well-Water in a pure state, yet it certainly contains this substance, because the permanent vapour that has been expelled by heat from this water, was found to be a mixture of that gas and air (see work above cited, v. 2. p. 94—104); and because the well is supplied with its water by a branch, or vein, of the spring which flows into the baths, as was lately discovered by a decisive observation. A particular account of this fact, for which we are indebted to the curiosity of several gentlemen at Buxton the last spring, together with several facts relating to the source of the Buxton-Water, and its former and present conveyance, with which I have been lately acquainted, shall very soon be communicated to the public in a different work.

B

method

method, this end may be attained in the following manner.

Boil a pint or a quart of the Buxton-Water in a Florence-flask, or any other glass vessel, for about twenty minutes, by which exposure to heat almost the whole of its permanent vapours.—Air, and its medicinal gas—will be expelled. Keep this boiled water in vessels quite filled with it while hot, and at the same time closed, to prevent its uniting with air. Fill the bottle F, when required, with this boiled water, and while it is inverted in a sufficient quantity of common spring-water, or the Buxton-Water, transfer into it the phial of gas A, in the manner above directed, and close it with its stopple. Let this bottle, with the medicinal gas added to it, stand in an inverted position a week or ten days, during which it should be frequently agitated: after this time the water in this bottle will be saturated with this gas confined within it. Then immerse
this

this bottle in the well for two or three hours, to acquire the temperature of the Buxton-Water; this being effected, after agitating it for a few minutes, the stopple may be taken out, and the water should be drunk speedily, as above directed.

By this means the Buxton-Water will be saturated with its medicinal gas only, whereas in its natural state it is united to an equal quantity of air, and this medicinal gas†; and it also contains, by this method, as much of this gas, as possible, in a state of suspension, consequently it is in this manner impregnated with a greater quantity of its medicinal gas, than this tepid water naturally contains.

Patients who have not an opportunity of drinking the Buxton-Water at the Fountain-Head, may produce all the medicinal effects of this substance at a distance from its source,

† Work before quoted, v. 2. p. 94—104.

(Excepting those changes which arise from the agents necessarily accompanying the use of the water at Buxton) by impregnating it with its medicinal gas, according to either of the methods described, p. 7, and 10, and then communicating the proper TEMPERATURE——
 82° of Fahrenheit's Thermometer,—by immersing the bottle F in a large quantity of common water, heated to about 120°, or 130°, and letting it stand till it be cooled to the temperature required.

The Buxton-Water may also be composed artificially in the following manner, and then impregnated further with its medicinal gas as described p. 7; and the proper temperature may be given according to the method just mentioned.

“ To thirty-two ounce measures of distilled hard-water, in a large Florence-flask, add about fourteen grains of the purest chalk in fine powder; and four grains of vitriolic selenites, composed by saturating quick-lime precipitated from lime-water by calcarious gas, with
 vitriolic

vitriolic acid. Expose this mixture in a sand-heat of about 140° or 150° , and after it has stood in this situation a week, or longer, during which time it has been frequently agitated, add about four grains of the purest sea salt;—then boil this mixture in the flask, or in a silver-vessel, so as to separate from it all the air it contains, and filter it through paper, previously washed by filtering through it hot distilled water.

Divide this filtered solution into four equal parts, one of which must be contained in a wine-quart-bottle; to each of these parts add $\frac{1}{4}$ of a quart, or as much as will fill these quart-bottles, of distilled water, previously boiled in a Florentine-flask, so as to have expelled all the air dissolved therein, and agitate for a short time each of these bottles. Then invert these bottles in a tub of common hard pump-water, and add thereto half an ounce measure of a mixture of one part of common air, and two parts of the perma-
nent

ment vapour that separates itself spontaneously from Buxton-Water; this done cork the bottles while inverted, and after preserving them in an inverted position out of the water for three weeks, a month, or six weeks, and agitating them frequently, upon withdrawing the cork from the bottles inverted in the tub of water, the permanent vapours will be found dissolved, or suspended; for water will rise within the bottles to occupy the place of these substances.

During the time these bottles are inverted, and uncorked in the tub of water, as little motion should be produced as possible, in order to prevent the mixture of the water of this vessel with that of the inverted bottle."

Air is an ingredient in the artificial Buxton-Water; but I am of opinion, that it may be advantageously omitted, if its bulk of this medicinal Gas be added in the place of it. Further; I am persuaded by reasoning, by the effects
of

of other artificial waters†, and the experience of the Buxton-Water prepared by art, that the medicinal effects of the natural compound even with the additional quantity of its peculiar gas, may be produced, in the most powerful manner, by saturating distilled snow, or rain-water, previously freed from air by boiling, with this permanent vapour in the manner above-described, p. 11, and then suspending it therein according to the method proposed p. 7. How the proper temperature must be given has been shewn, p. 12.

Physicians at a distance from Buxton may probably, in consequence of this publication, be desirous of exhibiting the Buxton-Water, or the artificial compounds of this substance with an additional quantity of its medicinal Gas; but they may not, without difficulty, be able to procure this subtile matter. To assist

† Bergman's work before cited p. 275.

* See p. 6,

gentlemen in these views I shall be extremely happy: If therefore any of them will acquaint me with their desire of employing this substance, I will take care that they shall be supplied with a sufficient quantity of the medicinal Gas of the Buxton water, for the purposes of practice, until a person of accuracy, and possessed of sufficient dexterity, shall make the collecting this permanent vapour from the gentleman's bath at Buxton an object of his business.

Besides the medicinal Gas of the Buxton water, there are two other Gases of great efficacy in medicated waters, namely, calcarious Gas, or fixed air, and hepatic Gas; † with one or both

† Springs impregnated with this Gas, have a smell resembling putrid eggs, or more exactly that which is emitted by a Solution of alkaline liver of sulphur, especially upon the addition of an acid, although sulphur, or hepar has been rarely separated from them by art; but some of them precipitate Sulphur spontaneously. In consequence of the discovery of the

both, of these we may impregnate the Buxton-Water, and thereby, for certain cases, render it a powerful remedy. The best contrivance I know, for this purpose, is, Nooth's glass-apparatus for impregnating water with fixed air; the manner of employing which has

the hepatic Gas, Bergman has explained this extraordinary property; he calls the Springs that are impregnated with this Vapour, hepatifated-waters, on account of their smell: and, for the same reason, this gas has been named hepatic gas. Many warm waters, as those of Aix la Chapelle, Caroline, &c; and some cold ones, as the Medway, Harrowgate, &c. are impregnated with the hepatic gas. Bergman found, that it was formed, and extricated, by pouring vitriolic or marine acid upon saline hepar sulphuris, upon the ores of lead called galenas, and upon a mass made of three parts of iron filings with two of melted sulphur. Distilled water will unite to, or suspend half of its bulk of the hepatic gas. Bergman says, that distilled water impregnated with this vapour, possesses the general properties of hepatifated springs, and that it even seems to surpass them; for the natural compounds also contain other substances which are either of no efficacy, or which diminish their virtues.

C

been

been so well explained, and is so commonly understood, that I deem it unnecessary for me to describe it.

When either the Buxton-Water itself, or the artificial compounds above-described p. 7—12, are thus saturated with fixed air, the medicinal Gas of the Buxton-Water may be suspended in it, see p. 7, and the temperature given as already mentioned.

If it be wished to unite, and mix the hepatic Gas only with the Buxton-Water, or its artificial compounds, in the place of chalk, or any other calcarious earth, Hepar Sulphuris must be used. It is to be made of equal weights of sulphur and potashes, which are to be melted together in a crucible. When used it must be reduced to powder. A mass made of three parts of iron filings with two of melted sulphur will answer the same end. †

† —Bergman, v. 1, p. 294.

If any of these waters is to be impregnated with both the fixed air, and the hepatic Gas, one part of the powdered chalk and four parts of the liver of sulphur must be employed together.

Water being thus charged with one, or both the above vapours, the medicinal Gas of the Buxton-Water may be suspended in it, and the temperature of 82° of Fahrenheit's Thermometer be given, as already shown.

F I N I S.



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